

AUC Cell Assembly

Required Materials

- (2) Window Holders
- (1) Centerpiece
- (1) Cell Housing
- (2) Windows (Quartz or Sapphire)
- (1) Screw Ring
- (1) Screw Ring Gasket
- (2) Window Liners
- (2) Window Gaskets
- (2) Fill Hole Gaskets (PTFE or neoprene)
- (2) Fill Hole Screws
- (1) Spin Analytical AUC Cell Assembly Torque Stand
- Screw Ring Grease

AUC Cell Assembly Procedure

1. Place a window gasket at the bottom of a window holder
2. Position the window liner inside the window holder so that the opening of the window liner is opposite the keyway of the window holder.
3. Place a window inside the window holder, aligning the scribe line on the window with the keyway of the window holder. Press down gently on the edges of both sides of the window. Make sure window is free of debris and/or fingerprints.
4. Repeat steps 1 through 3 to assemble the second window assembly.
5. Slide a complete window assembly in the cell housing with the window facing up by aligning the keyway with the cell housing key.
6. Insert centerpiece into cell housing and align the centerpiece keyway with the cell housing key and let it fall gently on top of the window assembly.
IMPORTANT: Never use a tool to push the centerpiece inside the cell housing, this could damage the centerpiece.
7. To insert the second window assembly into the cell housing, hold the cell housing on its side and position the second window assembly so the window is facing the centerpiece. Slide assembly into cell housing making sure the keyway of the window assembly is aligned with the key way of the cell housing.
8. Place screw ring gasket on top of second window assembly. Lightly coat the screw ring and screw ring gasket with an approved lubricant like lithium grease or Spinkote™ to ensure proper sealing and torquing of the cell assembly. Spread a very thin coating of lubricant on the threads of the screw ring. Apply a thin coat of lubricant to the screw ring gasket as well. Wipe off any excess lubricant.



9. Screw the screw ring into the housing, making sure the word UP is facing you. (The word OUT is found on Beckman screw rings)
10. At this point, if you look inside the cell assembly, you will see Newton's rings. These rings indicate there is still air between the windows and centerpiece and will disappear after torquing. For more information about Newton's rings: http://en.wikipedia.org/wiki/Newton%27s_rings

Torquing Instructions

1. Using the Spin Analytical AUC Cell Assembly Torque Stand, place the assembled cell housing onto the torque stand so the slots in the bottom of the cell housing engage the steel key in the collet fixture. Make sure the black collet fixture handle is in the vertical position.
2. Gently push torque stand shaft down to cell housing and rotate until the steel key engages the slots in the cell's screw ring. Be sure to firmly press down on shaft to ensure it is seated correctly.
3. Close collet by rotating the handle forward to the horizontal position and then pressing down firmly.
4. Install 3/8" square drive of torque wrench into square hole on top of shaft.
5. Place right hand onto the torque wrench on the shaft side and apply pressure down to keep steel key firmly engaged with screw ring.
6. Use left hand to rotate torque wrench in the clockwise direction to tighten the screw ring. To ensure the most accurate torque reading, rotate the torque wrench in the clockwise direction (tighten) to 130-140 in-lbs (Spin Analytical recommends between 130-140 in lbs). Stop tightening for a few seconds. Then proceed tightening to the 130-140 in-lb mark.
7. When approaching the target pressure the torque wrench needle should not jump or jitter but move in a smooth continuous fashion up to the desired torque.
IMPORTANT: Any jumping of the needle indicates that the cell components are settling into position. If this happens rotate the torque wrench in the counter clockwise direction to loosen the screw ring and begin again.
8. After the desired torque reading is achieved, disengage the shaft by pulling it up away from the cell housing. Remove the torque wrench and stow it in the holder at the back of the torque stand. Rotate the black collet handle to the vertical position and remove the cell.

Sample Loading Requirements

- (2) Spin Analytical Socket Head Fill Hole Screws
- (2) Fill Hole Screw Gaskets (available in PTFE and neoprene)
- (1) 23 Ga stainless steel blunt end syringe tip or Gel loading tip with capillary end
- (1) Torque Screwdriver
- Forceps

Sample Loading Instructions

1. Positioning the cell on its side so the fill holes are facing up, slowly dispense 430 μ l of reference solution into the left sector of the Spin50 12 mm centerpiece with a pipette and gel loading tip through the left fill hole (325 μ l of solution for Spin60 12 mm centerpieces).
IMPORTANT: While it is okay to fill sectors with metal syringe tips, it is imperative NOT to scratch the sector walls while filling. Scratches in the walls will damage the centerpiece rendering it unus-

able.

NOTE: Spin50 12 mm centerpieces dimensions are equivalent to Beckmans standard 2-channel centerpieces.

*4-hole and 8-hole cell holder filling stations are available and can be purchased from Spin Analytical.

2. To seal the cell, place a fill hole gasket into the reference solution fill hole (left) using forceps (we recommend using either PTFE or Neoprene fill hole gaskets, both available from Spin Analytical).
3. Insert a socket fill hole screw into the threaded hole in the reference side of the housing and secure with either a standard 5/64" hex head screw driver or an adjustable torque screwdriver with hex bit. Use of an adjustable torque screwdriver can prevent damaging the screw head by over tightening. If fill hole screws are damaged, they can be removed with a screw extraction kit available from Spin Analytical so that the housing and cell components are not damaged.
4. Using the same pipette tip, carefully fill the right sector with 430 μ l of sample solution. To match the volume to the volume in the reference channel, make sure the pipette tip is attached tightly to the pipette, load and dispense solutions slowly, avoid bubbles while loading, and use the same pipette tip for both solutions.

NOTE: for low concentration experiments with the interference optical system, it is crucial to have equal volumes in both the reference and sample channels so that the radial positions of the menisci match. It is advantageous to match menisci in other cases (both absorbance and interference optics) to match the solvent sedimentation in both reference and sample channels. Meniscus matching centerpieces are available at Spin Analytical. These custom designed centerpieces have capillary grooves that mechanically transfer solution so that both sectors have matching meniscus locations eliminating errors by trying to match volumes by hand. Because a reference is not used in fluorescence work, it is not necessary to match menisci with the Aviv FDS optics.

*Spin Analytical recommends either of the following tips for loading centerpieces:

23 Ga stainless steel blunt end syringe tip (Small Parts P/N NE-231PL-25)

Gel loading tip with capillary end (VWR 37001-150)

5. Repeat steps 3 and 4 to seal the cell's sample solution fill hole (right).

NOTE: Sealing each fill hole immediately after loading it's corresponding sector, prevents possible cross-contamination.

Counterbalance and Alignment

Spin Analytical does not recommended running a rotor with empty cell positions. Each rotor hole should be filled with a cell housing or counterbalance. Running a rotor with empty cell positions can put stress on the rotor, ultimately shortening the life-time of your rotor.

If you're running like cells in rotor positions directly opposite one another, they are most likely the same weight, however, it is recommended to check the weights. If you don't have another sample cell to put directly opposite your sample cell in the rotor, use a counterbalance. The masses of the cells within the rotor must be balanced.

1. Before loading the rotor, Spin Analytical recommends the counterbalance(s) be 0.1 g lighter (0.2 g lighter is acceptable) than the sample cell directly opposite it in weight.
NOTE: The counterbalance should be lighter than the sample cell, so if there is a leak, the masses get closer together and not farther apart.
2. Begin with the balance set to zero. Weigh the sample cell first, then tare the balance to subtract the sample cell weight.

3. Next, weigh the counterbalance that will be used in the position directly opposite the sample cell. Add or subtract weight from the attachment hole of the counterbalance, making sure the weights do not protrude from the top.
4. Make sure the counterbalance final weight is within 0.1 g of the sample cell weight.
5. Repeat until all cell positions in the rotor are full and balanced.

Using the Spin Analytical AUC Cell Alignment Tool

1. Place a cell into the desired rotor hole, rotating the cell housing slightly in the clockwise direction (as viewed from above), and push the cell down into the rotor until it seats on the bottom of the hole.
2. Insert the Spin CAT tool into the bottom of the rotor. The tool's leg fits into the center hole of the rotor and the raised circular section at the head fits into the hole with the cell to be aligned. The tool should fit snugly but not tightly. If the tool doesn't fit into the rotor, DO NOT FORCE IT, as this could damage the rotor and/or the alignment tool.
3. In order for the tool to fully seat, the rotating key must engage with the rectangular cutouts in the bottom of the cell housing. Rotate the key by moving the alignment tool arm until you feel the key pop into the cell housing cutouts and then firmly push the tool in so that it fully seats into the rotor. Be sure the tool doesn't force the cell up when doing this.
4. Now, holding the rotor right side up, grasp the tool body and rotate the alignment tool arm until it reaches the set screw stop. In this position, the arm will be aligned approximately with the tool body (be careful not to pinch yourself). The cell housing is now correctly aligned.
5. Remove the tool by gently rocking the body until it disengages from the rotor. When doing this, be careful not to disturb the alignment of the cell housing when removing the tool.

For further information about AUC centerpieces, tools, and software, please visit our website at www.spinanalytical.com